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THE TIME TO PEAK VASODILATATION IS SIGNIFICANT DETERMINANT OF BRACHIAL ARTERY FLOW-MEDIATED VASODILATATION IN HYPERTENSION: ANALYSIS USING A NOVEL SEMI-AUTOMATIC VESSEL CHASING SYSTEM OF UNEXEF18G

ACC Poster Contributions
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Background: We have developed a novel semi-automatic vessel wall chasing system named UNEXEF18G that not only can precisely measure brachial artery (BA) diameter on-line during flow-mediated vasodilatation (FMD) study but also is able to measure easily the time to peak vasodilatation of BA-FMD (Peak BAdt).

Methods and Results: By using this, we perform BA-FMD in total 935 scans in 894 subjects. Although BA-FMD is well established method for measuring endothelial function, FMD measurement is technically difficult even if following FMD measurement guideline. In order to validate the novel UNEXEF18G system, BA-FMD was measured in 82 healthy subjects (53±9, ranging 35-71 years old) who received annual health check. FMD correlated with Framingam risk scores ($r=-0.28$, $p<0.05$) and BA diameter, age, gender, smoking and heart rate (HR) were independent predictors for FMD by multivariate regression analysis. Since FMD is reported to be impaired in hypertension and to investigate if Peak BAdt is useful to determine FMD, BA-FMD including Peak BAdt was measured by UNEXEF18G in 122 hypertensive patients aged around 50 (49±3 years old), all man, with >79% smoking habits. As a result, BA diameter and Peak BAdt were only independent predictors for FMD. To confirm the role of Peak BAdt, FMD was repeatedly measured by UNEXEF18G in 41 mild hypertensive patients (68±8 years old) before and after the treatment of either olmesartan 20 mg or losartan 50 mg daily for 4 - 8 weeks. FMD increased (3.3±1.5% to 4.4±2.1%, $P<0.05$) and Peak BAdt decreased (51±14 sec to 45±11 sec, $P<0.05$). On the other hand, BA-FMD was measured in 649 healthy subjects without hypertension aged around 50 (50±3 years old), all man, with >70% smoking habits. BA diameter and HR, but not Peak BAdt were only independent predictors for FMD.

Conclusions: Not only BA diameter but Peak BAdt could be significant determinant of BA-FMD in hypertensive patients if FMD is precisely measured by a novel equipment of UNEXEF18G.